



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/575,187	04/06/2006	Masayasu Futagawa	245402015100	7151

25226 7590 12/20/2007  
MORRISON & FOERSTER LLP  
755 PAGE MILL RD  
PALO ALTO, CA 94304-1018

EXAMINER
----------

CHEN, KEATH T

ART UNIT	PAPER NUMBER
----------	--------------

1792

MAIL DATE	DELIVERY MODE
-----------	---------------

12/20/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/575,187

Applicant(s)

FUTAGAWA ET AL.

Examiner

Keath T. Chen

Art Unit

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 06 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 04/06/2006.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim interpretation***

Claims 1 and 8, "moving means for ..., control means for ..., heating means for ..." are considered under 35 U.S.C. 112 6th paragraph (MPEP 2181).

The moving means is disclosed in [0043], lines 1-4. It has also been interpreted as a solid structure holding the substrate and capable of moving substrate up and down.

The control means is disclosed in [0046], lines 8-10 and line 18. It has also been interpreted as a CPU.

The heating means is disclosed in [0041], line 7 (substrate heater).

Claims 6 and 7, line 2, the antecedent basis of "said control (before)" is in line 16 of claim 1. However, said control could be of control during growth only, or control during growth as well as after processing. Claims 6 and 7 will be examined with both interpretation, the broadest interpretation.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claims 1-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 8 recite the limitation "each growth condition" in line 12. There is insufficient antecedent basis for this limitation in the claim. It is not clear what growth conditions are included in the claim.

Claims 1 and 8 will be examined as "temperature and pressure", as disclosed in lines 19-23, page 8 of specification.

The term "decrease ..." in claims 1 and 8, last line, is not clear as compared to what?

The term "on the inside ..." in claim 2, line 3, is not clear as inside of what?

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
  2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
2. Claims 1-5 and 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arai et al. (US 20010001384, hereafter '384), further in view of Xia et al. (US 20010000476, hereafter '476).

'384 teaches some limitations of claim 1:

A vapor deposition method using a reactant gas ([0068], lines 1-2) to form a thin film ([0077]) on a substrate ([0068], lines 3-4) in a process chamber (process vessel, #1,

[0062], line 2), using an apparatus including: the process chamber; a flow channel (space #1a, above W and #5d, see [0061], [0063], and [0069]); a substrate holding portion (susceptor #5, [0063]); moving means ([0075], lines 1-2, a solid structure supporting wafer and moves substrate up and down, see page 2) for relatively moving the substrate holding portion and said flow channel; and heating means (IR lamps, #9a-b, [0062]) for heating said substrate.

'384 does not teach other the limitations of claim 1:

Control means for controlling the moving means; wherein in advance before crystal growth, said control means measures relative positions of the flow channel and the substrate holding portion under each growth condition and stores positional data concerning the measured positions, and based on a set growth condition as well as the stored positional data, said control means performs control of the position of the substrate holding portion or the position of the flow channel to decrease a change in relative positions of the flow channel and the substrate.

'476 is an analogous art in the field of semiconductor film deposition ([0001] and [0002]) particularly in improving uniformity ([0014], line 10, '384, [0026]). '384 provides a method that demonstrates superior uniformity ([0014]) which incorporates a control means (#160, Fig. 5, [0044], particularly, lines 5-8, lift substrate to a desired height to control spacing between substrate and the top of chamber) which controls the moving means based on growth condition ([0044], lines 15-16, in response to process

parameters), with the stored positional data ([0034], pedestal position parameter, in 2<sup>nd</sup> last line, is part of stored computer program, lines 12-13). '476 also teaches a sensor ([0032], lines 8-10) to provide positional information of pedestal.

At the time the invention was made, it would have been obvious to a person having ordinary skill in the art to have combined '476 with '384. Specifically, to have adopted the process control program as taught by '476, including control means for moving means and stored positional data, in the apparatus in Fig. 4 of '756, for the purpose of achieving superior uniformity, as taught by '476 and desired by '384.

To store the positional data of the pedestal, as taught by '476, it would have required measurement of the position data as a function of process parameters (or growth condition) before the crystal growth. By using the stored positional data, it inherently decreases a change in relative positions of the flow channel and the substrate, as opposed to moving the pedestal in random direction.

'384 further teaches the limitations of:

Claim 2: The position of the substrate holding portion is controlled so that a bottom surface on the inside and on a substrate holding side of the flow channel is coplanar with a crystal growth surface of the substrate (as shown in Fig. 4, the top surface of pedestal, or a bottom surface on the inside of the flow channel, is coplanar with substrate surface).

'476 further teaches the limitations of:

Claim 3: At least two growth conditions are set (process selector #148 in Fig. 5 respond to process parameters, [0041], lines 11-12).

Claim 4: said growth condition includes a heating temperature of the substrate ([0041], line 15).

Claim 5: said growth condition includes an internal pressure of the process chamber ([0041], lines 15-16).

Claim 7: Said control means performs said control before and still after the set growth condition is reached (control means performs unloading by lowering pedestal #104 after the growth condition is reached, [0044]).

Apparatus claim 8 is rejected for substantially the same reason as claim 1 rejection above. Furthermore, applicant's claim requirements "in advance before crystal growth ... the flow channel and the substrate" are considered intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02). A position measurement device, however, is required by the above claim requirements.

3. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over '384 and '476, further in view of Glew et al. (US 6204174, hereafter '174).

'384 and '476, together, teach all limitations of claim 1, as discussed above. '476 does not explicitly specify the control sequence of substrate positioning relative to pressure and heater controls in Fig. 5.

'384 and '476, together, do not explicitly teach the limitations of claim 6:

Said control means completes said control before the set growth condition is reached.

'174 is an analogous art in the field of deposition of semiconductor substrate (col. 1, lines 9-11) particularly in providing a uniform laminar flow over the wafer (col. 5, lines 36-38). '174 teaches to place substrate in the deposition zone before the pressure and temperature are established.

At the time the invention was made, it would have been obvious to a person having ordinary skill in the art to have combined '174 with '384 and '476. Specifically, to have adopted the control sequence of completing substrate placement first, as taught by '174, to the control sequencer #150 of Fig. 5 of '476, with a reasonable expectation of success. The motivation would have been suitable sequence from a limited set of choices. The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, U.S. 327, 65 USPQ 297 (1945).



**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Keath T. Chen whose telephone number is 571-270-1870. The examiner can normally be reached on M-F, 8:30-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KC

*KC*

  
MICHAEL CLEVELAND  
SUPERVISORY PATENT EXAMINER